Article published online: 2021-08-02

Measuring brain activity

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Human brain and mind has ever baffled all, leaving one with wonderment, with centuries of hard work by so many to be able to understand this. One always wondered how to evaluate and measure the brain activities, and functional MRI (fMRI) is one such fastest developing method, which has now found amazingly widespread usage in many branches of neurosciences.

This special edition of functional MRI in IJRI is essentially to understand the basics of fMRI and its clinical utility, from an Indian perspective, while also giving a brief insight into where it is headed in future, with major breakthrough present research and discovery in the fields of brain connectivity and resting state fMRI.

Except for a few centers, fMRI is still in its primitive stage in India and way behind the western world, as compared to other radiology subspecialties. Perhaps it is due to lack of awareness (both by radiologists and clinical neuro-colleagues) and also due to inertia to use fMRI, since it requires immense patience and training, not to forget the need for special hardware and software, which add expenses to an already expensive MRI machine. The whole idea of coming up with this special edition was to bring awareness and an interest amongst the radiologists all over our country. There is no doubt that once our clinical colleagues in neurology and neurosurgical departments get a taste of a well-done fMRI, they will be asking for more, as it really eases many complex dilemmas in a non-invasive manner and can be easily repeated to test its validity as and when needed. Nevertheless, as one may get excited with this technique, one needs to be aware of the various pitfalls, difficulties encountered in clinical patients, a caution in interpretation of the data, and many other similar aspects, which have been covered in this edition.

Access this article online	
Quick Response Code:	Website: www.ijri.org
	DOI: 10.4103/0971-3026.130680

This journal begins with how fMRI began and evolved to the current state and where it is headed in future. To get a good fMRI, it is important to have all tools in place and understand the paradigms and planning to get accurate data, which is covered in the second chapter. As we see that most international papers talk about fMRI in research areas, it is important to know how it can be clinically useful in day-to-day practice, which is eventually its aim. This is covered in the chapter on usage of fMRI in pre-operative work-up.

To evaluate language is a commonly asked indication for clinical fMRI, but evaluating language on fMRI can get tough, especially considering the number of languages used in India and in the pediatric age-group, which has been covered in the next chapter. The subsequent chapter also adds a wonderful taste to this edition giving an insight about our own Indian "Devanagari" script – a research-based study from National Brain Research Institute (NBRC). Evaluating the cognitive functions in clinical situations can be really difficult and is covered in the next topic.

Hopefully, this edition will bring an added interest, with easy understanding and guidance to the radiologists in our country to start using fMRI in routine practice, so as to eventually help the patient. I cannot thank enough each and every author in this edition because when I had approached them initially to write, every single author instantaneously agreed to pen down these articles, as we all unanimously felt the need for the same in our country. I would also like to take this opportunity to thank all my fellow colleagues, including our hospitals' neurologists and neurosurgeons. Special thanks to Dr. Meher Ursekar, who has been instrumental in invoking and maintaining my interest in fMRI, and lastly to the Almighty Supreme in the form of my Master/Guru, who enables us to do all that we do.